IN THE CLAIMS:

Claim 1 and 18 are amended herein. All pending claims and their present status are produced below.

1. (Currently Amended) An optical communications system for communicating information comprising:

a receiver subsystem comprising:

an optical splitter for splitting a composite optical signal having at least two subbands of information and at least one tone into at least two optical signals; and

at least two heterodyne receivers, each heterodyne receiver coupled to receive one of the optical signals from the optical splitter for recovering information from one of the subbands contained in the optical signal, each heterodyne receiver comprising:

a heterodyne detector for mixing an optical local oscillator signal with the optical signal to produce an electrical signal which includes a frequency down-shifted version of the subband and the tone of the optical signal; and

a signal extractor coupled to the heterodyne detector for mixing the frequency down-shifted subband with the frequency down-shifted tone to produce a frequency component containing the information,

wherein a signal extractor of one of the at least two heterodyne receivers comprises a bandpass filter, a square law device, and a low pass filter and is configured to square an optical signal containing a tone and a sideband, and wherein a signal extractor of another of the at least two heterodyne receivers comprises two extraction paths and a combiner, each extraction path configured to process a sideband within an electrical signal.

2. (Previously Amended) The optical communications system of claim 1 wherein the optical splitter includes a separate splitter for separating each optical signal from the composite signal.

3. (Original) The optical communications system of claim 1 wherein the optical splitter includes an optical power splitter for splitting the composite optical signal into optical signals which are substantially the same in spectral shape.

4. (Original) The optical communications system of claim 1 wherein the optical splitter includes a wavelength division demultiplexer for wavelength division demultiplexing the composite optical signal into the optical signals.

5. (Original) The optical communications system of claim 1 wherein the optical splitter includes a wavelength-selective optical power splitter for splitting the composite optical signal into optical signals, each optical signal including a different primary subband and attenuated other subbands.

6. (Original) The optical communications system of claim 1 wherein:

the electrical signal further comprises direct detection components; and

the frequency down-shifted version of the subband does not spectrally overlap with the direct detection components.

7. (Original) The optical communications system of claim 1 wherein the heterodyne detector comprises:

an optical combiner for combining the optical local oscillator signal and the optical signal; and

a square law detector disposed to receive the combined optical local oscillator signal and optical signal.

8. (Original) The optical communications system of claim 1 further comprising:

an optical wavelength filter coupled between the optical splitter and one of the heterodyne receivers.

9. (Original) The optical communications system of claim 1 wherein the tone for each optical signal is located at an optical carrier frequency for the corresponding subband.

10. (Original) The optical communications system of claim 1 wherein the tone for each optical signal includes a pilot tone located at a frequency other than at an optical carrier frequency for the corresponding subband.

11. (Original) The optical communications system of claim 1 wherein at least two optical signals have tones at the same frequency.

12. (Original) The optical communications system of claim 1 wherein the frequency component includes a difference component.

13. (Original) The optical communications system of claim 1 wherein the receiver subsystem further comprises:

at least two FDM demultiplexers, each FDM demultiplexer coupled to receive the frequency component from one of the heterodyne receivers for FDM demultiplexing the frequency component into a plurality of electrical low-speed channels.

14. (Original) The optical communications system of claim 13 wherein the receiver subsystem further comprises:

at least two QAM demodulation stages, each QAM demodulation stage coupled to one of the FDM demultiplexers for QAM demodulating the electrical low-speed channels.

15. (Original) The optical communications system of claim 1 further comprising: a transmitter subsystem for generating the composite optical signal.

16. (Original) The optical communications system of claim 15 wherein the transmitter subsystem comprises:

at least two transmitters, each for generating one of the subbands, each transmitter using a different optical carrier frequency; and

an optical combiner coupled to the transmitters for optically combining the subbands into the composite optical signal.

17. (Original) The optical communications system of claim 15 wherein the transmitter subsystem comprises:

at least two electrical transmitters for generating electrical channels;

an FDM multiplexer coupled to the electrical transmitters for FDM multiplexing the electrical channels into an electrical high-speed channel, the electrical high-speed channel further including the tones; and

an E/O converter coupled to the FDM multiplexer for converting the electrical high-speed channel into the composite optical signal.

18. (Currently Amended) A method for recovering information from a composite optical signal containing the information, the method comprising:

receiving a composite optical signal having at least two subbands of information and at least one tone;

splitting the composite optical signal into at least two optical signals; and

for each optical signal:

receiving a signal from an optical local oscillator;

detecting the optical signal using heterodyne detection and the optical local oscillator to produce an electrical signal which includes a frequency down-shifted version of one of the subbands and the tone of the optical signal; and

mixing the frequency down-shifted subband with the frequency down-shifted tone to produce a frequency component containing the information, wherein the step of mixing comprises one of: mixing by a signal extractor comprising a bandpass filter, a square law device, and a low pass filter configured to square an optical signal containing a tone and a sideband and mixing by a signal extractor comprising two extraction paths and a combiner, each extraction path configured to process a sideband within an electrical signal.

19. (Original) The method of claim 18 wherein the step of splitting the composite optical signal into at least two optical signals includes separating each optical signal from the composite optical signal.

20. (Original) The method of claim 18 wherein the step of splitting the composite optical signal into at least two optical signals includes splitting the composite optical signal into optical signals which are substantially the same in spectral shape.

21. (Original) The method of claim 18 wherein the step of splitting the composite optical signal into at least two optical signals includes wavelength division demultiplexing the composite optical signal into the optical signals.

22. (Original) The method of claim 18 wherein the step of splitting the composite optical signal into at least two optical signals includes wavelength selectively splitting the composite optical signal into optical signals, each optical signal including a different primary subband and attenuated other subbands.

23. (Original) The method of claim 18 wherein the step of detecting the optical signal using heterodyne detection and the optical local oscillator comprises:

optically combining the optical local oscillator signal and the optical signal; and

detecting the combined optical local oscillator signal and optical signal using square law detection.

24. (Original) The method of claim 18 wherein the tone for each optical signal is located at an optical carrier frequency for the corresponding subband.

25. (Original) The method of claim 18 wherein the tone for each optical signal includes a pilot tone located at a frequency other than an optical carrier frequency for the corresponding subband.

26. (Original) The method of claim 18 further comprising, for each optical signal:

FDM demultiplexing the frequency component into a plurality of electrical low-speed channels.

27. (Original) The method of claim 26 further comprising, for each optical signal:

QAM demodulating the electrical low-speed channels.

28. (Original) The method of claim 18 further comprising:

encoding the information in a composite optical signal; and

transmitting the composite optical signal across an optical fiber.

29. (Original) The method of claim 28 wherein the step of encoding the information in a composite optical signal comprises:

encoding the information onto subbands, each subband located at a different optical carrier frequency; and

optically combining the subbands to produce the composite optical signal.

30. (Original) The method of claim 28 wherein the step of encoding the information in a composite optical signal comprises:

generating electrical channels;

FDM multiplexing the electrical channels into an electrical high-speed channel, the electrical high-speed channel further including the tones; and

converting the electrical high-speed channel from electrical to optical form to produce the composite optical signal.

31. (Original) The method of claim 28 wherein the step of encoding the information in a composite optical signal comprises:

receiving an optical carrier; and

modulating the optical carrier with the information using a raised cosine modulation biased at a point substantially around a V_π point.